

A scenic landscape photograph of a river valley. In the foreground, a river flows through a valley with green, grassy hillsides. A dirt road runs along the left bank of the river. In the middle ground, there are several small, light-colored tents or structures near the river. The background features a range of mountains with some snow-capped peaks under a clear sky.

Visual Resources and

WIND Development

Visual Resources- WIND

- Wyoming Wind Development
(Trying to do it “right”)
- Environmental Design Strategies
- Where Do We Go From Here?

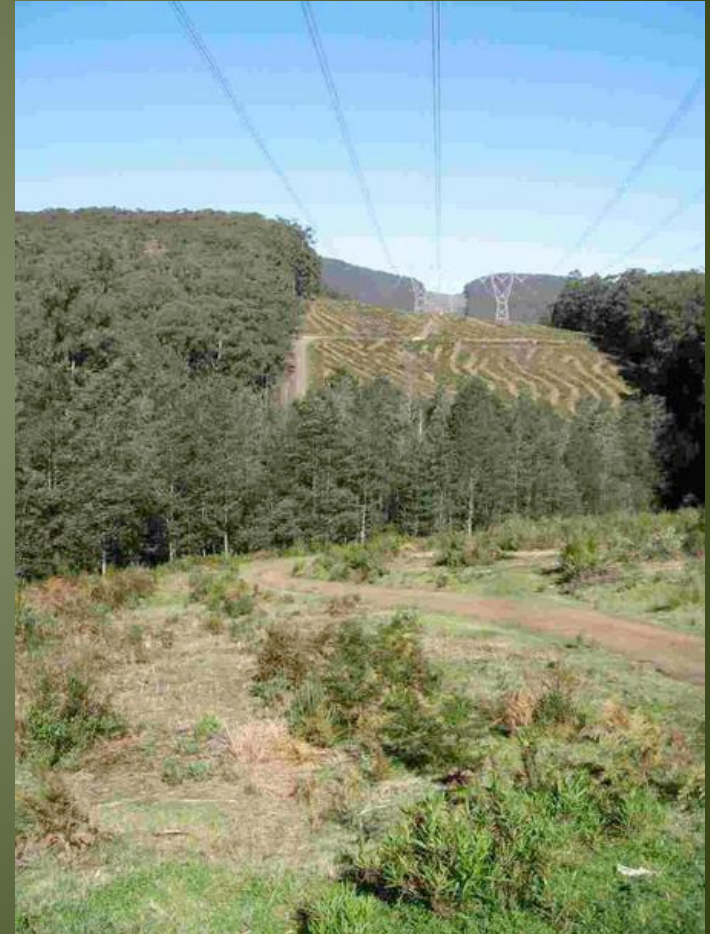


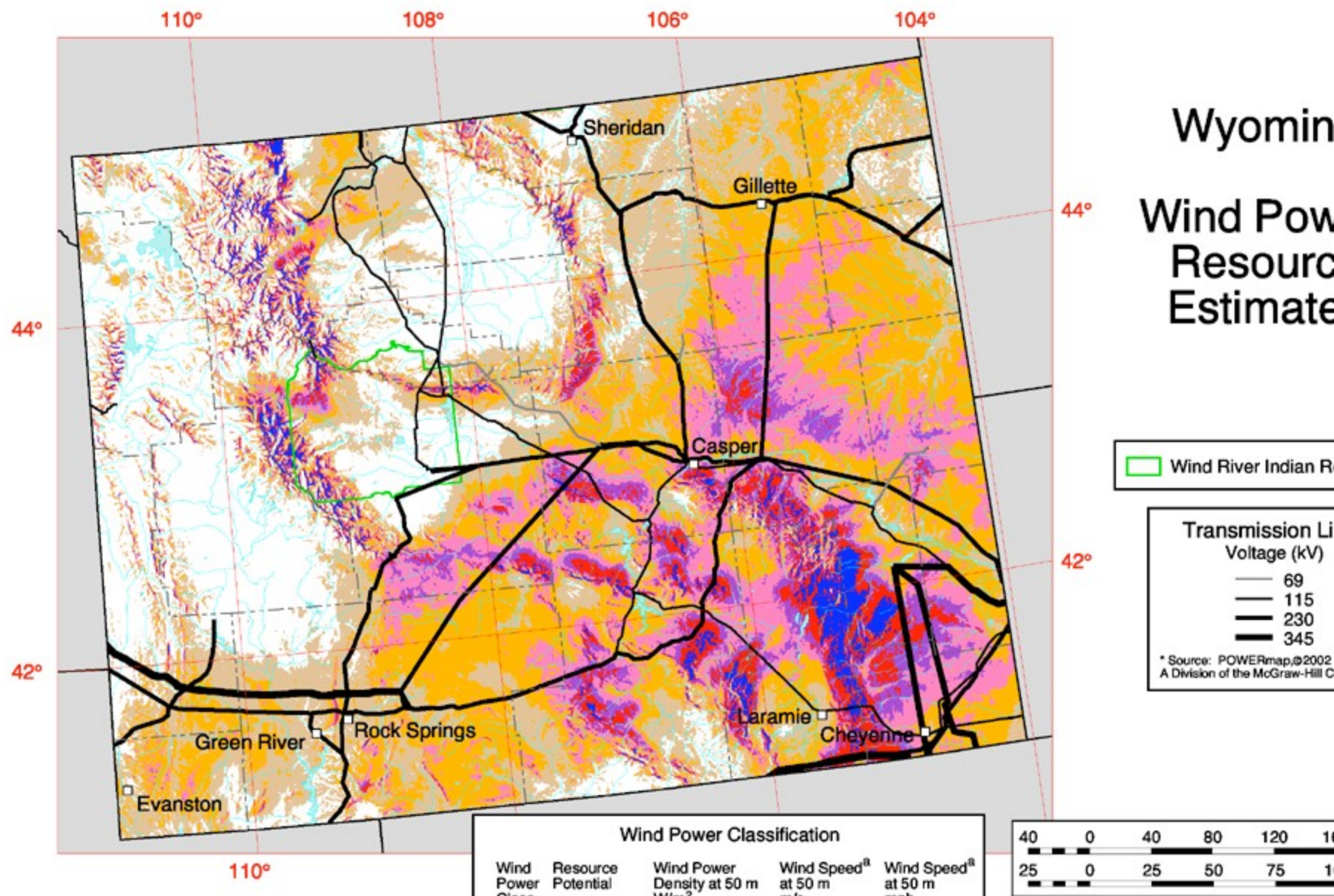
87% of Our
Experiences
come from
What We See!

The background image shows an outdoor scene at a ranch. An older man with grey hair, wearing a dark blue long-sleeved shirt and light blue jeans, is bent over, using a metal tool to work on a dark-colored animal lying on the ground. A young boy, wearing a light blue denim shirt, a white baseball cap with a black brim and a logo, and light blue jeans, is kneeling next to the animal, holding its head. In the background, several other people are visible, including a man in a red t-shirt and blue jeans, and a woman in a grey sweatshirt that reads "GENUINE BUFFALO COUNTRY TERRY BISON RANCH" and "ESTABLISHED 1994". The ground is dirt and grass.

Four Key Factors Dictating Where Wind Development Occurs in Wyoming...

1. High Quality Winds
2. Transmission Facilities
3. Sage Grouse (T&E)
4. Public Acceptance





The wind power resource data for this map was

U.S. Department of Energy
National Renewable Energy

Potential High Voltage Transmission Line Projects In the Western United States

LEGEND

Transmission Line Corridors Within WECC

- Gateway South Project
- Gateway West Project
- TransWest Express Project
- Mountain States Transmission Inter tie Project
- Northern Lights Ceililo Project (Conceptual)
- Northern Lights Inland Projects
- Wyoming to Colorado Inter tie Project (TOT3)
- Boardman to Hemingway Project
- Southwest Inter tie Project
- Overland Inter tie Project
- Sunzia Project
- High Plains Express Project (Conceptual)
- Navajo Transmission Project
- Palo Verde to Devers Project
- Sigurd to Red Butte Project
- First Wind Project (Conceptual)
- One Nevada Transmission Line
- PNW/Canada - Northern California Project (Conceptual)
- Mona to Oquirrh
- Populus to Terminal
- Sunrise Powerlink
- Winnemucca to Harry Allen

Jurisdiction/Ownership

- Bureau of Land Management
- Bureau of Indian Affairs
- U.S. Forest Service
- National Park Service
- Department of Defense
- U.S. Fish & Wildlife Service
- State/Private

REFERENCE FEATURES

- State Boundary
- WECC Boundary
- Interstate
- Highway



Data Source Information

Land Ownership: BLM Denver Service Center, 2007.

NOTE: Transmission corridors are schematic and do not represent precise locations.

Prepared For:



March 10, 2009

Prepared By:



Wyoming Wind Workshop



WYO Public Acceptance?

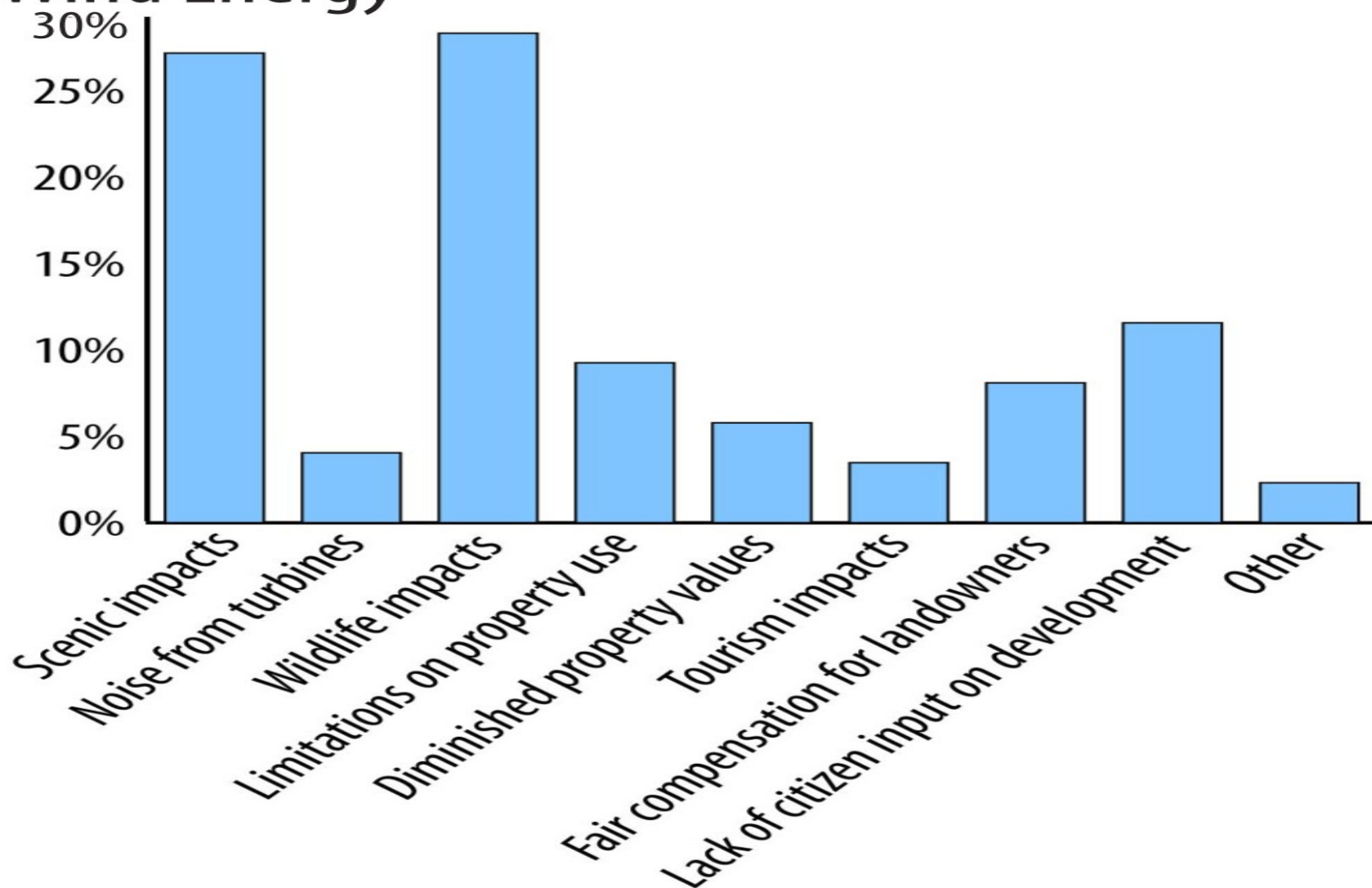
Support:

- \$ benefit to landowners
- Green Energy
- Economic Development
- Employment
- Taxes Income

Oppose:

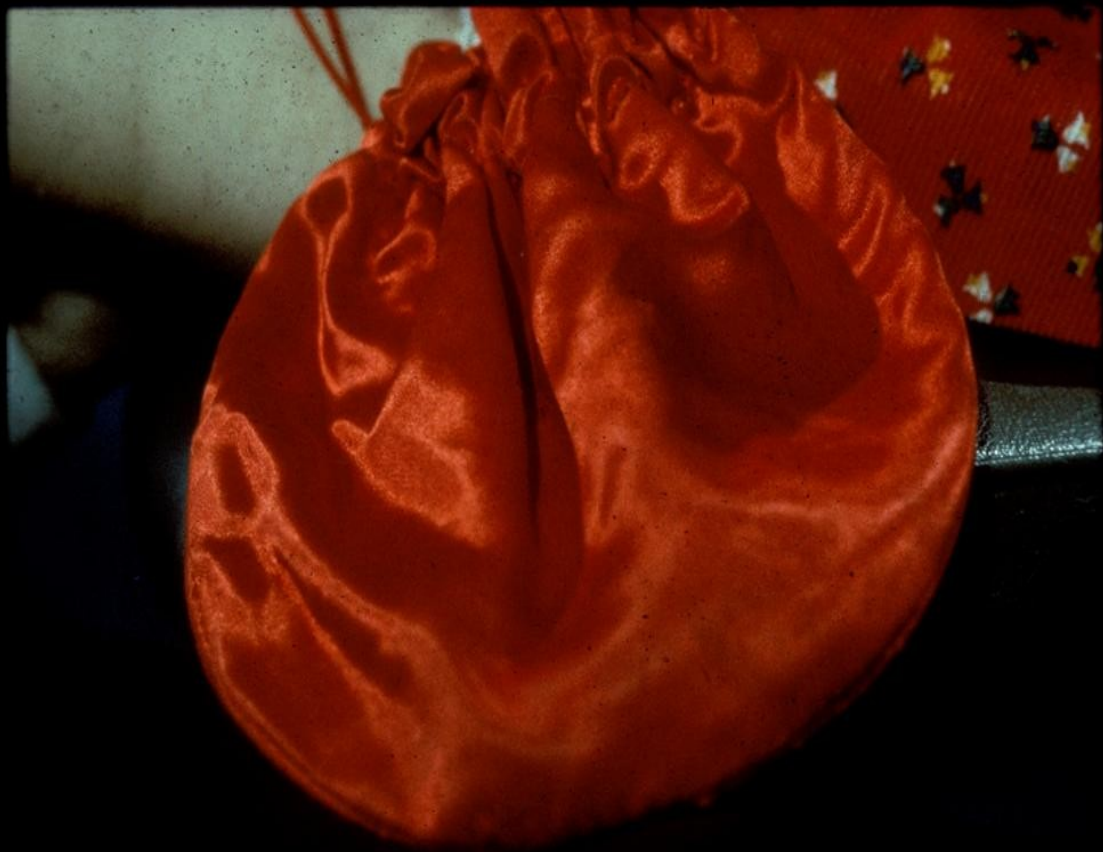
1. Visual Impact (Industrialztn)
2. Wildlife Concerns
3. Inadequate compensation
4. Export Mentality (WY v CA)
5. Loss of Access to P. Lands

Participants' Greatest Concerns about Wind Energy



Visual Resources- *WIND*

- Wyoming Wind Development
- **Environmental Design Strategies**
- Where Do We Go From Here?



Silk Purse
or a
Sow's Ear???

Wind *Programmatic EIS*- VRM Mitigation

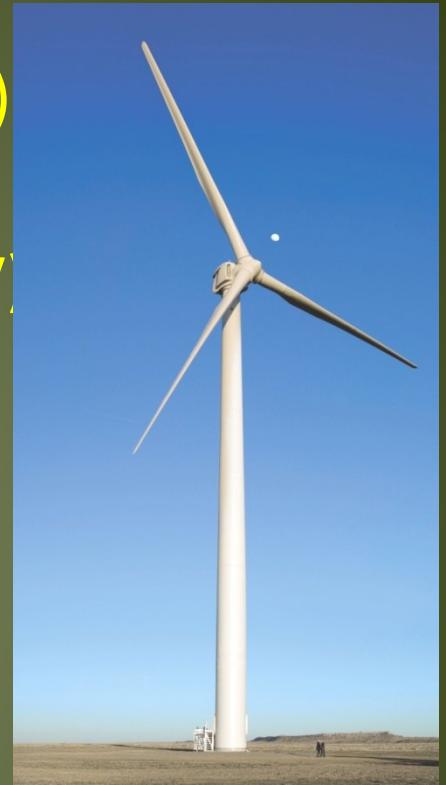
- **Public Involvement**
- Visualization of all visual resource impacts
- Conduct surveys on public perceptions and attitudes
- **Integrate into surrounding landscape and consider for the elements of design**
- Provide a visual order... not disorder (clutter)
- Cluster and provide breaks in arrangement
- **Color treatment to reduce visual impact**
- **Use non-reflective paints**
- Uniform and non-attracting color treatment
- Tubular towers (if best) not lattice
- **Facilities away from ridgelines & avoid steep slopes**
- Bury lines and cables and minimize surface disturbance
- Minimize need for security lighting

Environmental Design Strategies

- Identify Best Location for Project Components
- Reduce Overall Project “Foot print”
- Repeat Natural Elements in Landscape (KOPs):
 - Form
 - Line
 - Color
 - Texture

Wind Project Components

- Wind turbines (387'-430' ground to blade tip)
- Transformers
- Underground electrical lines (600V to 34.5 kV)
- Overhead electrical lines (34.5 to 69 kV)
- Substations
- Gravel access roads 22' to 32'
- Power Transmission Systems
- Communication System (fiber optic/radio)
- Anemometer Tower(s)
- Maintenance or Storage Yards
- Operations Center (building)
- Worker's Building/Facilities



Linear Alignments

- There are lots of bad examples out there (no mitigation)

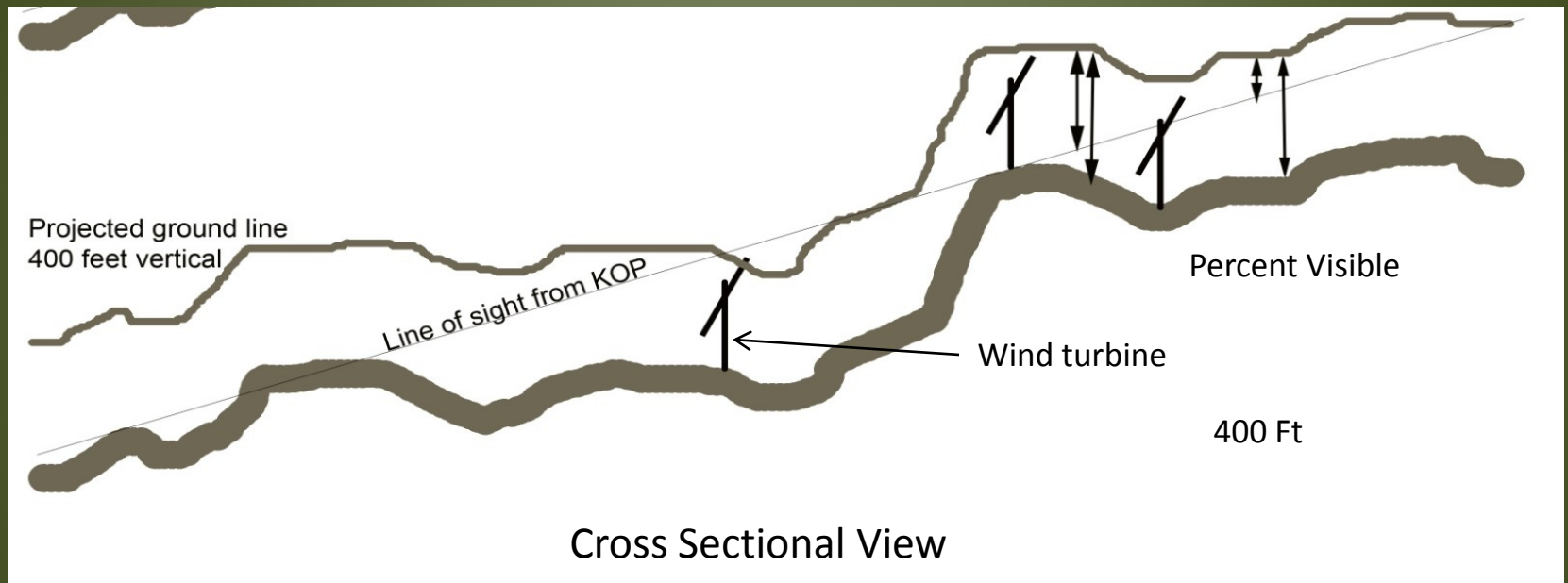


Location, Location, Location!!!



Wind Turbines @ 13 miles

Proper Topographic Location





Use Location & Topography to
Reduce Visibility

Proper Siting & Location

- Power Line Located Below Skyline Reduces Visibility
- Reduce the Surface Disturbance Foot Print & Reclaim



Locate Structures Out of Viewshed



Environmental Design Strategies

- Identify Best Location for Project Components
- Reduce Overall Project “Foot Print”
- Repeat Natural Elements Found in Landscape:
 - Form
 - Line
 - Color
 - Texture

Met Tower



Very little surface disturbed

Minimize Project “Foot Print”



No Wind Power Disturbance in View

A photograph of a wind farm in a grassy field. Several large white wind turbines are visible, with one in the foreground and others in the distance. A dirt road or path leads towards the turbines. The sky is blue with scattered white clouds. The text "Reduce Foot print and Reclaim Disturbances asap..." is overlaid in white at the bottom of the image.

Reduce Foot print and
Reclaim Disturbances asap...

Minimizing the “Foot Print” of a Project



without Design Mitigation



with Design Mitigation

Environmental Design Strategies

- Identify Best Location for Project Components
- Reduce Surface Disturbance & RECLAIM asap
- Repeat Natural Elements Found in Landscape:
 - Form
 - Line
 - Color
 - Texture

Repeating the natural “Form”



Repeating the Element "FORM"

- Place towers in openings repeating natural forms
- Avoid linear surface disturbances



Mitigate "Line" Contrast



Good color on lattice towers but glare off lines

Repeat Natural “LINES”



without Design Mitigation



with Design Mitigation

Road Blends with “Lines” in Landscape



“Texture” in Road Reclamation



Repeating Natural “Texture”



Colors or Standard White?



Simulated Covert Green



Simulated Shale Green





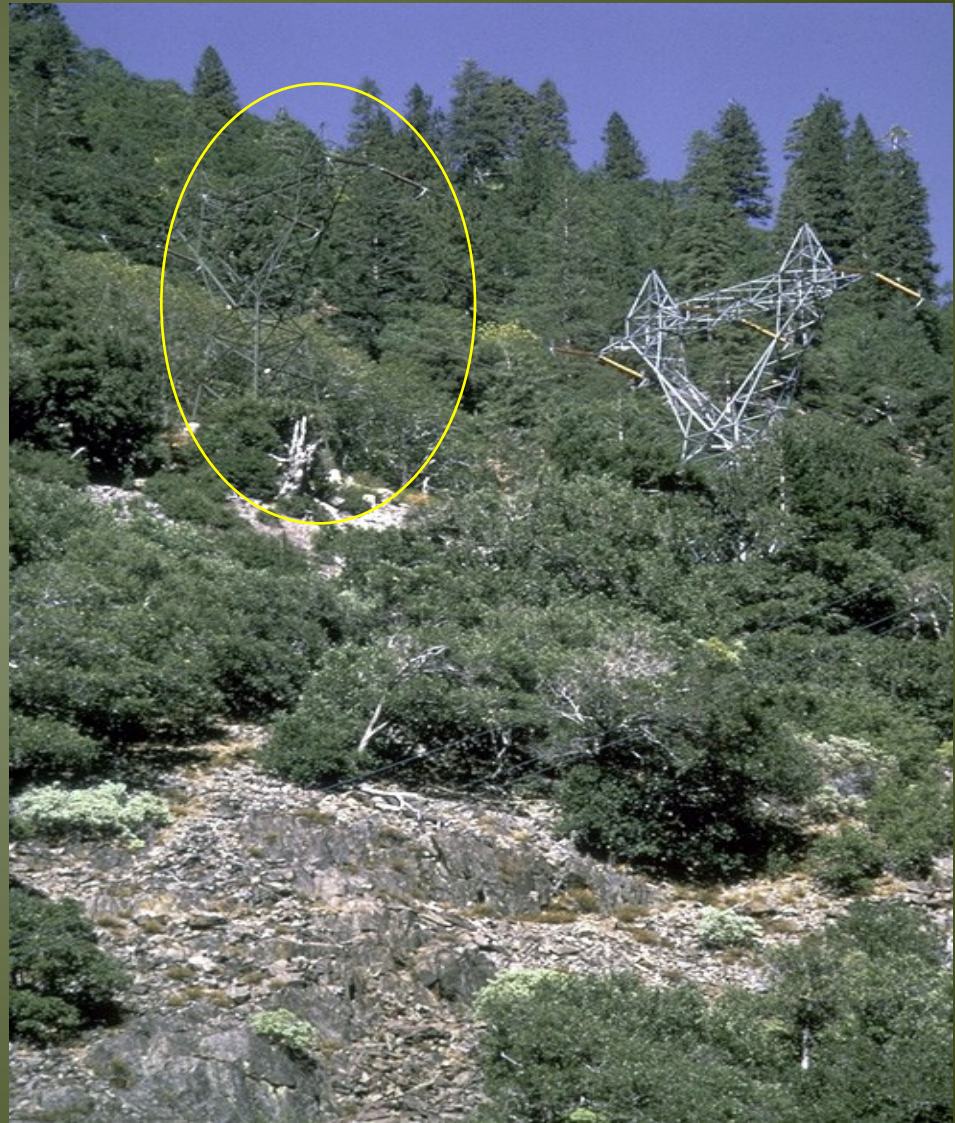
Repeat Natural "COLORS"

Larger scale color treated lattice tower recedes into landscape better than small scale untreated substation



Repeat Natural "COLOR"

Simple application of color and form makes the 2nd transmission tower transparent against the landscape background



Minimizing Visual Contrast- COLOR



With limited Design Mitigation



better Design Mitigation





Field Testing Patterns



Five test panels?

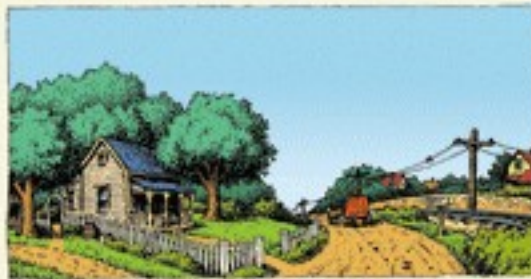
Visual Resources- *WIND*

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Where Do We Go From Here?

- Renewable Energy BMP Publication
- NHT/NST Setting and Mitigation Analysis
- Renewable Energy Camouflage Study (testing)

Plan with *Robust* Public Involvement and Science to *Do It Right!*



“You must be the change that you wish to see in the world”

Gandhi



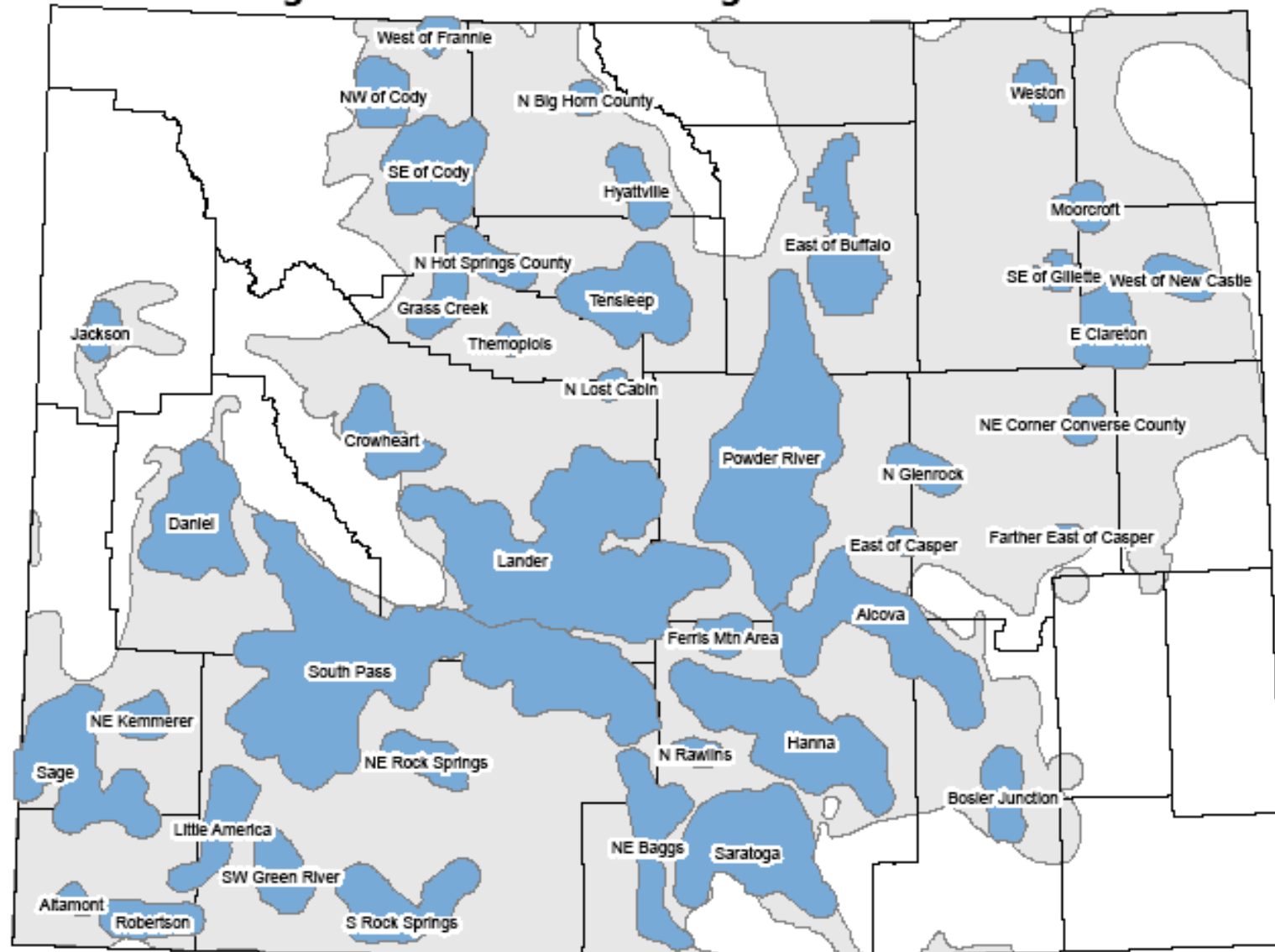
87% of Our Experiences- ***What we See!***



Sage Grouse and *WIND*

	<u>Sage Grouse Range</u>	<u>Core Areas</u>
Class 4+ WIND (acres)	5,767,110 37%	3,467,239 22.6%
Coal Production ('08T)	40,689,632 86.6%	18,608,268 4%
Natural Gas ('08 MCF)	1,870,047,244 83%	46,085,906 2%




Sage-Grouse Core Breeding Areas Version 2



Nyssa Whitford
Nongame GIS Analyst
Lander Regional Office
08.15.08



Core Areas shown were delineated by the Governor's Sage-Grouse Implementation Team during their 03.17.08 meeting in Lander, WY. Updates to the NE core areas from BLM-BFO.

 Core Areas 06.07.08
 Counties
 Current Sage-Grouse Distribution

87% of Our Experiences- ***What we See!***



Repeating natural “**LINES**”

- Road follows natural lines of the landscape





White Turbines Simulated for Environmental Doc.



Repeat Natural “Colors”

Covert Green

Shale Green

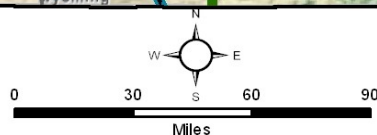


	Within State-Wide Sage Grouse Range	Within Core Areas
Class 4+ Developable Winds (acres)	5,767,110	3,467,239
Class 4+ Developable Winds (percent of state-wide total)	37.6%	22.6%
Coal Production (2008 tons)	40,689,632	18,608,268
Coal Production (percent of state-wide 2008 total)	86.6%	4%
Natural Gas Production (2008 total MCF)	1,870,047,244	46,085,906
Natural Gas Production (percent of 2008 state-wide total)	83%	2%
Oil Production (2008 total bbls)	24,634,700	8,026,750
Oil Production (percent of 2008 state-wide total)	63.5%	20.7%
Private Lands (acres)	10,934,694	5,323,665
Private Lands (percent of state-wide total)	39.7%	19.3%
State Lands Grazing Leases (acres)	616,623	330,545
State Lands Grazing Leases (percent of state-wide total)	64.9%	34.8%
AUMS in BLM Grazing Allotments (acres)	3,683,519	2,551,863
AUMS in BLM Grazing Allotments (percent of state-wide total)	95.1%	65.9%



Potential Wind Energy and Transmission Line Projects

- Pathfinder Proposed Route
- TWE Proposed Route
- EGS Proposed Route
- Testing and Monitoring ROW
- Full Field Development ROW



FOR INTERNAL USE

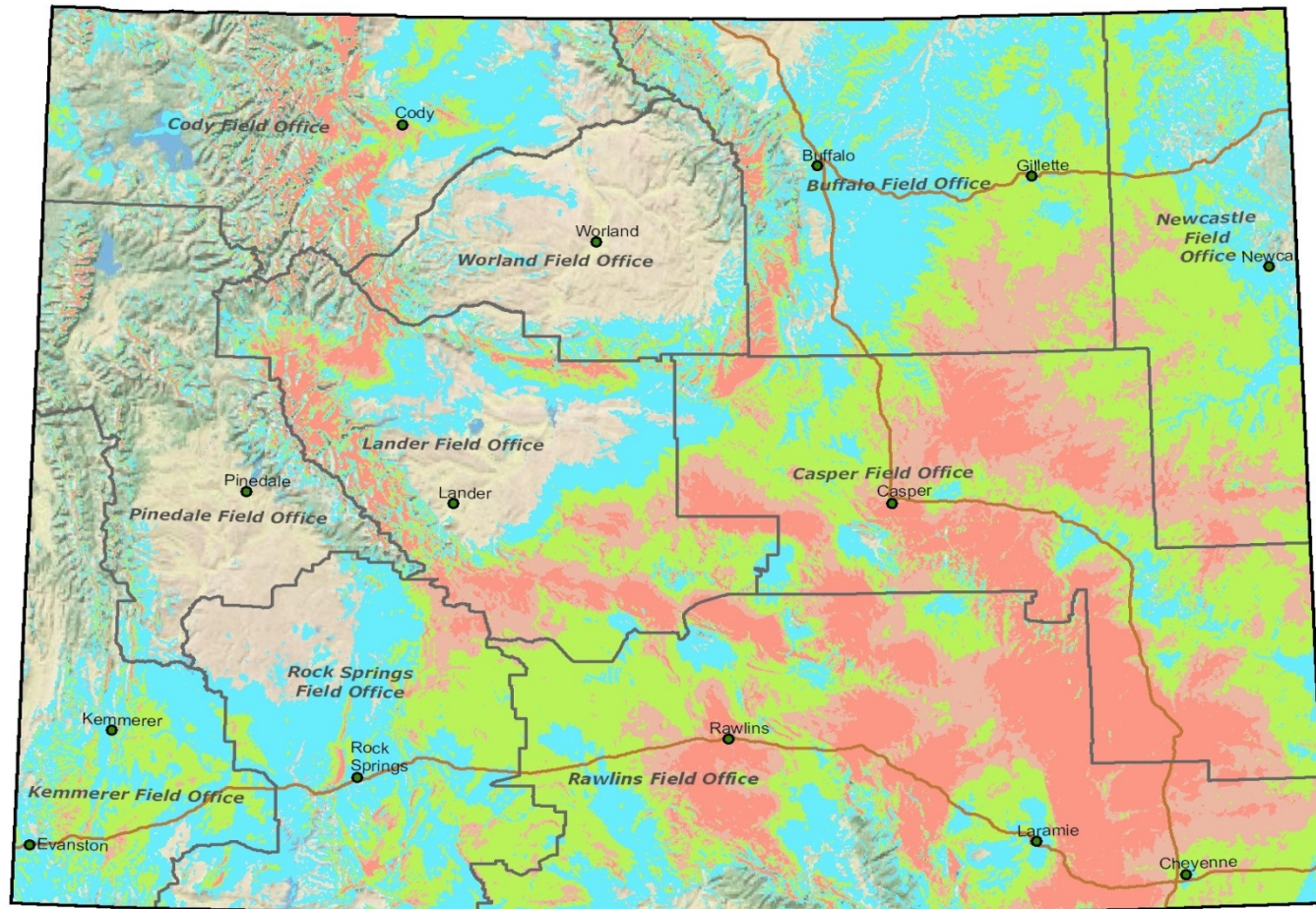
Data Sources:

Wind facility data was extracted from LR2000 and mapped based on Right of Way legal description. This dataset is current to 5/15/2009.

Proposed transmission/power line routes were supplied by individual companies.

Date of Map: 5/21/2009

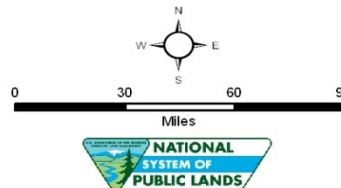
Wyoming *WIND Development*



Potential Wind Energy and Transmission Line Projects

Wind Classes

- 2 - Marginal
- 3 - Fair
- 4 - Good
- 5 - Excellent-Superb



Data Sources:

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Proposed transmission/power line routes were supplied by individual companies.

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FOR INTERNAL USE

What is Visual Resource Management VRM...

- BLM's system to address human concern for scenery and manage changes made to the visual environment.
- Systematic approach to inventorying, understanding, and managing visual resource values.
- Use good planning and design principles when managing scenic values or the “Visual Setting” of other resources (eg. Cultural/Historic).

BLM'S **Authority** for Managing Scenery

National Environmental Policy Act (NEPA) 1969

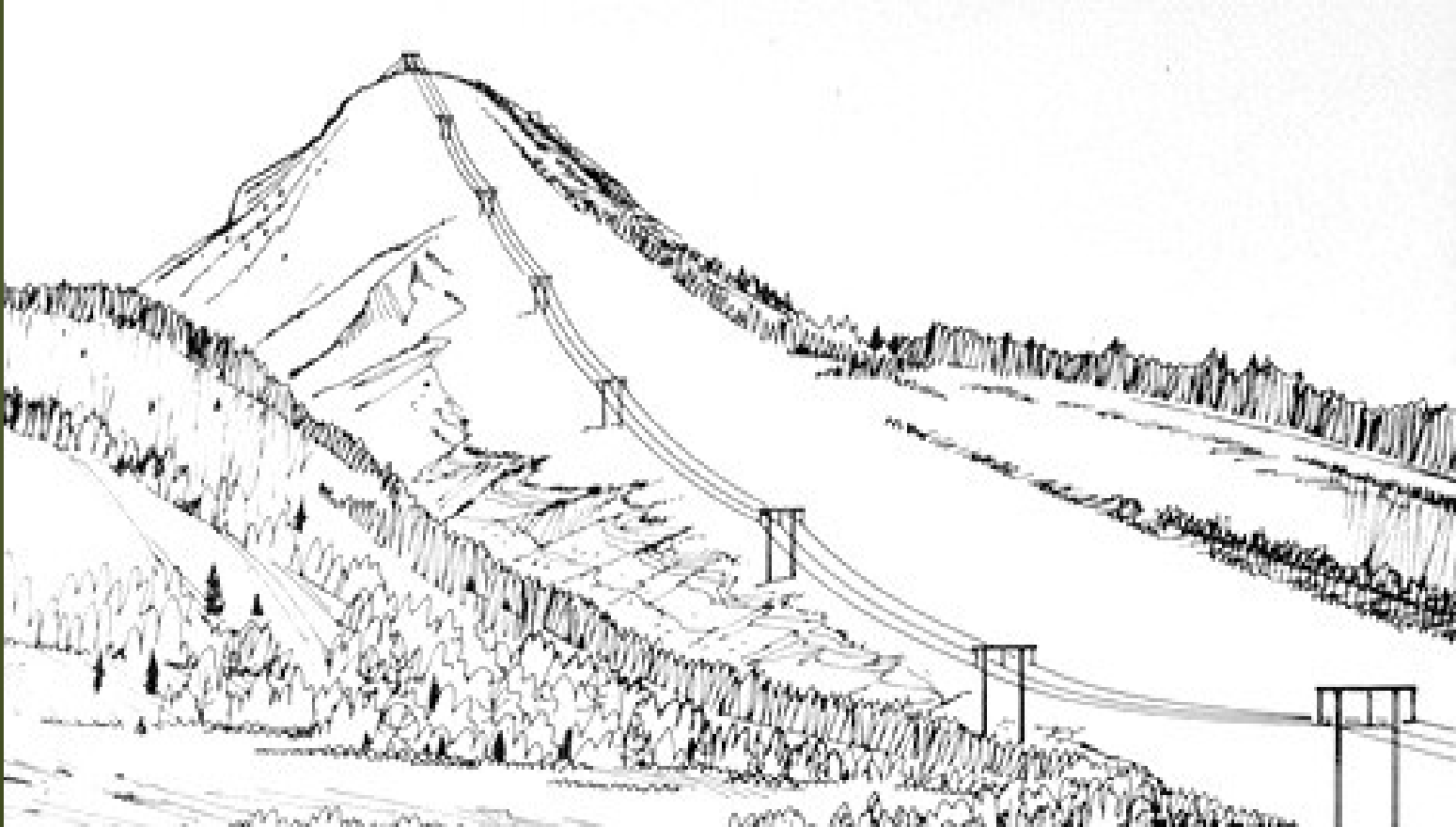
- Assure aesthetically pleasing surroundings
- Require agencies use a system based on environmental design arts for planning , design, and mitigation

The Federal Land Policy and Management Act (FLPMA) 1976

- Protect scenic values
- Maintain an inventory of scenic values
- Minimize damage to scenic values

Linear Alignments

- Find the Best Location



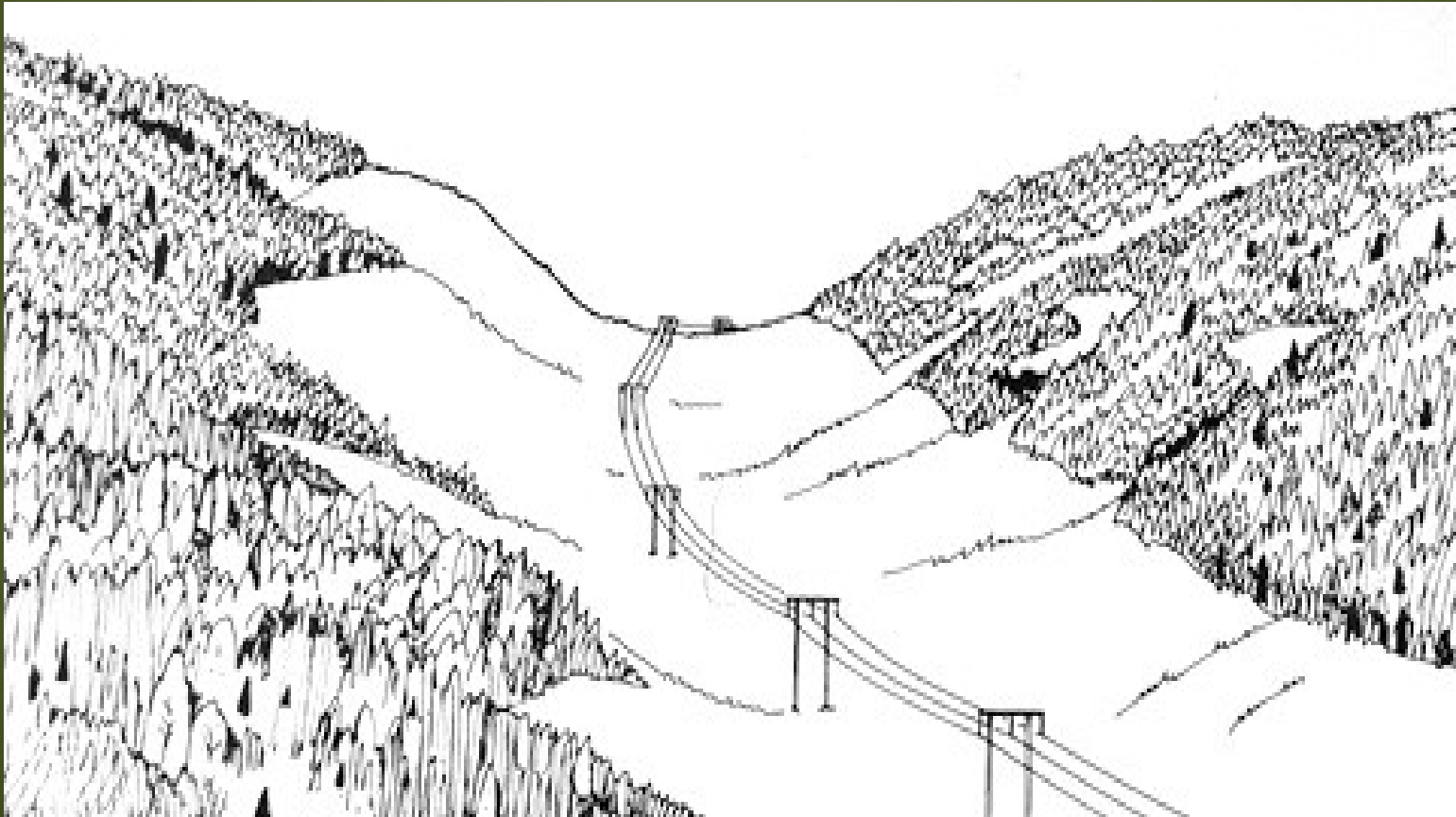
Linear Alignments

- Power line located below ridge; repeats elements



Linear Alignments

- Find the Best Location!



Linear Alignments

- Relocate ROW to edge of opening; repeat linear element

